Having described the preferred embodiments, the invention is now claimed to be:

1. An x-ray tube **(12, 212)** that injects an x-ray conebeam into an examination region **(14)**, the x-ray tube **(12, 212)** including:

a rotating cylindrical anode **(30, 230, 330, 430)** having a target outer surface region, the cylindrical anode **(30, 230, 330, 430)** rotating about a longitudinally aligned cylinder axis **(32)**;

an electron accelerating means **(54, 56, 254, 256)** for accelerating electrons toward at least one selected spot on the target outer surface region of the cylindrical anode **(30, 230, 330, 430)** to generate x-rays; and

a sweep means **(64, 68, 270)** for relatively longitudinally sweeping the at least one selected spot across the target outer surface region of the cylindrical anode **(30, 230, 330, 430)**.

2. The x-ray tube as set forth in claim **1**, wherein the cylindrical anode **(30, 230, 330, 430)** includes:

a central supporting cylinder **(350)**; and

a metallic layer **(352)** at least a portion of which defines the target outer surface region.

3. The x-ray tube as set forth in claim **2**, wherein the central supporting cylinder **(350)** includes:

an outer shell **(450)** defining a hollow cylinder core; and

at least one structural support member **(452)** disposed in the hollow cylinder core, the at least one structural support member **(452)** mechanically coupled to an associated rotating shaft **(440)**.

4. The x-ray tube as set forth in claim **2**, wherein the metallic layer **(352)** is a tungsten coating.

5. The x-ray tube as set forth in claim **1**, wherein the cylindrical anode **(30, 230, 330, 430)** includes:

a substantially solid metallic cylinder **(30, 230)**, at least a portion of an outer surface of said solid metallic cylinder **(30, 230)** defining the target outer surface region of the cylindrical anode.

6. The x-ray tube as set forth in claim **1**, wherein the cylindrical anode **(30, 230, 330, 430)** includes:

a substantially hollow outer cylindrical shell **(450)**; and

at least one structural support member (452) disposed in the substantially hollow outer cylindrical shell (450), the at least one structural support member (452) mechanically coupled to an associated rotating shaft (440).

7. The x-ray tube as set forth in claim 1, wherein the accelerated electrons define an electron beam (60, 260), and the sweep means (64, 68, 270) includes:

an electron deflector (64, 68) that selectively deflects the electron beam (60, 260) to sweep the at least one selected spot across the target outer surface region of the cylindrical anode.

8. The x-ray tube as set forth in claim 7, further including:

a rotating cylindrical helical-slot collimator (90) having a helical collimating slot (92) formed therein, the collimator (90) surrounding the rotating cylindrical anode (30, 330, 430) and rotating about a collimator axis (91) parallel to the cylinder axis (32), a helical pitch of the helical collimating slot (92) and a rotation rate of the collimator (90) being selected relative to the sweep of the at least one selected spot such that the at least one selected spot coincides with the helical-slot (92) during the sweeping.

9. The x-ray tube as set forth in claim 8, further including:

an evacuated frame (36) that surrounds the rotating cylindrical anode (30, 330, 430), the rotating cylindrical helical-slot collimator (90) being arranged outside of the evacuated frame (36).

10. The x-ray tube as set forth in claim 8, wherein the rotating cylindrical helical-slot collimator (90) includes:

an outer cylindrical shell (100) surrounding the rotating cylindrical anode (30, 330, 430) and aligned with the collimator axis (91), the outer cylindrical shell (100) having a first helical slot defined therein; and

an inner cylindrical shell (102) surrounding the rotating cylindrical anode (30, 330, 430) and disposed inside the outer cylindrical shell (100), the inner cylindrical shell (102) being aligned with the collimator axis (91) and having a second helical slot defined therein that aligns with the first helical slot, the first and second helical slots cooperatively defining the helical collimating slot (92).

11. The x-ray tube as set forth in claim 10, wherein the outer and inner cylindrical shells (100, 102) are secured together and rotate as a unit.

12. The x-ray tube as set forth in claim 8, further including:

a fixed axially limiting collimator (106) that axially limits the x-rays.

13. The x-ray tube as set forth in claim 1, wherein the sweep means (64, 68, 270) includes:

a longitudinal reciprocating mechanism (270) longitudinally reciprocating the cylindrical anode (230, 330, 430) to effect a longitudinal reciprocating sweep of the at least one selected spot across the target outer surface region of the cylindrical anode (230, 330, 430).

14. A CT scanner including:

a rotating gantry (22) which rotates around an examination region and an axis of revolution, the x-ray tube (12, 212) of claim 1 being mounted to the rotating gantry with the cylinder axis (32) parallel to the axis of revolution;

an x-ray detector (16) arranged to detect x-rays after the x-rays pass through the examination region; and

a reconstruction processor (120) for reconstructing output signals from the x-ray detector into an image representation.

15. The computed tomography imaging system as set forth in claim 14, further including:

a synchronization circuit (132) that synchronizes the sweep with rotation of the rotating gantry (22).

16. The computed tomography imaging system as set forth in claim 14, further including:

a rotating cylindrical helical-slot collimator (90) having a helical collimating slot (92) formed therein, the collimator (90) surrounding the rotating cylindrical anode (30, 330, 430) and rotating about a collimator axis (91) that is parallel to the cylinder axis (32), a helical pitch of the helical collimating slot (92) and a rotation rate of the collimator (90) being selected relative to the sweep of the at least one selected spot such that the at least one selected spot coincides with the helical-slot (92) during the sweeping.

17. A method of generating x-rays including:

rotating a cylindrical anode (30, 230, 330, 430) about a cylinder axis (32), the cylindrical anode (30, 230, 330, 430) having a cylindrical target outer surface region;

accelerating electrons toward at least one selected spot on the target outer surface region of the cylindrical anode (30, 230, 330, 430) to generate x-rays; and

relatively sweeping the at least one selected spot continuously across the target outer surface region of the cylindrical anode **(30, 230, 330, 430)** along a beam trajectory substantially parallel to the cylinder axis **(32)**.

**18.** The method as set forth in claim **17**, wherein the relative sweeping includes:

steering at least one electron beam **(60)** defined by the accelerated electrons longitudinally across the cylindrical anode **(30, 330, 430)**.

**19.** The method as set forth in claim **17**, wherein the relative sweeping includes:

fast-retracing the at least one electron beam **(60)** to return to a longitudinal sweep starting point subsequent after each longitudinal sweep across the cylindrical anode **(30, 330, 430)**.

**20.** The method as set forth in claim **17**, wherein the relative sweeping includes:

longitudinally reciprocating the cylindrical anode **(230, 330, 430)** to effect longitudinal reciprocating sweeping of the at least one selected spot on the target outer surface region of the cylindrical anode **(230, 330, 430)**.

**21.** The method as set forth in claim **17** further including:

rotating a helical-slot collimator **(90)** around a collimator axis **(91)** that is parallel to the cylinder axis **(32)**; and

sweeping the at least one selected spot in coordination with rotating the helical-slot collimator.

**22.** The method as set forth in claim **21** wherein the collimator axis **(91)** corresponds to the beam trajectory.

**23.** The method as set forth in claim **21** wherein the at least one selected spot includes a plurality of spots separated by a helical pitch of a helical slot of the helical-slot collimator that generate a corresponding plurality of x-ray beams **(76, 76')**.

**24.** The method as set forth in claim **17**, further including:

rotating the cylindrical anode **(30, 230, 330, 430)** around an axis of rotation, the axis of rotation being parallel to the cylindrical axis **(32)**;

sweeping the at least one selected spot in coordination with the rotating;

detecting the x-rays which have passed through a subject along the axis of rotation;

converting the detected x-rays into an image of the subject.